

Listing of CLAIMS

1. (**Currently amended**): A method of joining workpieces comprising:

a) providing a first thermoplastic workpiece comprising a first surface, the first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

~~ab) creating a first-surface diffusion zone-containing therein a first polymerizable material, wherein said first surface diffusion zone is adjacent to a first surface of a first workpiece and is within said first workpiece; and,~~ comprising a first polymerizable material within the first thermoplastic workpiece adjacent to the first surface;

c) removing any non-absorbed excess of said first polymerizable material from said and drying the first surface; and,

d) providing a second thermoplastic workpiece comprising a second surface, the first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

~~b e) creating a second surface diffusion zone-containing therein a second polymerizable material, wherein said second surface diffusion zone is adjacent to a second surface of a second workpiece and is within said second workpiece; and,~~ comprising a second polymerizable material within the second thermoplastic workpiece adjacent to the second surface;

f) removing any non-absorbed ~~excess of said~~ second polymerizable material from ~~said and drying the~~ second surface, and

_____ wherein said first polymerizable material and said second polymerizable material are capable of bonding with each other; ~~and,~~

eg) bringing ~~said the~~ first surface and ~~said~~ second surface into intimate contact at a bonding surface interface; and,

eh) causing ~~said the~~ first polymerizable material and ~~said the~~ second polymerizable material to react and join across ~~said the~~ bonding surface interface.

2. (Currently amended): A The method of ~~joining as in claim 1~~ wherein at least one of ~~said~~ the first surface or ~~said the~~ second surface has at least one microfeature formed therein.

3. (Canceled)

4. (Canceled)

5. (Currently amended): A The method of ~~joining as in claim~~ ~~[[4]]~~1 wherein ~~said the~~ first workpiece and ~~said the~~ second workpiece are polyphenylenes and ~~said the~~ first polymerizable material and second polymerizable material are mixtures of styrene and divinylbenzene.

6. (Currently amended): A The method of ~~joining as in claim 5~~ wherein ~~both of said the~~ mixtures have a ratio of approximately 9:1 by volume of styrene to divinylbenzene.

7. (Currently amended): A method of joining workpieces comprising:

a) creating a first surface diffusion zone containing ~~therein~~ a polymerizable material within a first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof, wherein said the first surface diffusion zone is adjacent to a first joining surface of ~~[[a]]the first thermoplastic workpiece and is within said workpiece and~~

~~_____~~ b) removing any non-absorbed ~~excess of said~~ polymerizable material from said and drying the first joining surface; and,

~~bc)~~ providing a second thermoplastic workpiece having a second joining surface, the second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof; and,

~~ed)~~ bringing said the first joining surface and said the second joining surface into intimate contact at a bonding ~~surface~~ interface; and,

~~de)~~ causing said the polymerizable material to react ~~and join~~ across said the bonding ~~surface~~ interface thereby joining the first and second thermoplastic workpieces.

8. (Currently amended): A ~~The~~ method of ~~joining as in claim 7~~ wherein at least ~~one of said~~ the first joining surface or said the second joining surface ~~has~~ includes at least one microfeature formed therein.

9. (Canceled).

10. (Canceled)

11. (Currently amended): A ~~The~~ method of ~~joining as in claim~~ ~~[[10]]~~**7** wherein ~~said the~~ first workpiece is a polyphenylene, ~~said wherein the~~ second workpiece is a polyetherimide and ~~said wherein the~~ polymerizable material is styrene.

12. – 21. (Canceled).

22. (Currently amended): A method of fabricating a microfluidic device comprising:

creating a first surface diffusion zone containing ~~therein~~ a first polymerizable material, ~~wherein said first surface diffusion zone is adjacent to a first surface of a first workpiece and is within said first workpiece; and,~~ within and adjacent to a first surface of a first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

removing any non-absorbed ~~excess of said~~ first polymerizable material from ~~said~~ and drying the first surface; ~~and,~~

creating a second surface diffusion zone containing ~~therein~~ a second polymerizable material, ~~wherein said second surface diffusion zone is adjacent to a second surface of a second workpiece and is within said second workpiece; and,~~ within and adjacent to a second surface of a second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

removing any non-absorbed ~~excess of said~~ second polymerizable material from ~~said~~ and drying the second surface; ~~and,~~

wherein ~~said~~ the first polymerizable material and ~~said~~ the second polymerizable material are capable of bonding with each other; and,

wherein at least one of ~~said~~ the first surface and ~~said~~ the second surface ~~has~~ surfaces have one or more microfluidic features formed therein; ~~and,~~

bringing ~~said~~ the first surface and ~~said~~ the second surface surfaces into intimate contact at a bonding ~~surface~~ interface so as to form a microfluidic device; and,

causing ~~said~~ the first polymerizable material and ~~said~~ the second polymerizable material to react and join across ~~said~~ the bonding ~~surface~~ interface, creating thereby a microfluidic device.

23. (Currently amended): A method of fabricating a microfluidic device comprising:

creating a first surface diffusion zone containing ~~therein~~ a first polymerizable material, ~~wherein said first surface diffusion zone is adjacent to a first surface of a first workpiece and is within said first workpiece; and,~~ within and adjacent to a first joining surface of a first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

removing any non-absorbed ~~excess of said~~ first polymerizable material from ~~said~~ and drying the first joining surface; ~~and,~~

providing a second thermoplastic workpiece having a second joining surface, the second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof; and,

wherein at least one of said ~~the~~ first ~~joining surface~~ and said second joining surface ~~has~~ surfaces comprise one or more microfluidic features formed therein; ~~and,~~

bringing said first ~~joining surface~~ and said ~~joining second surface~~ the first and second joining surfaces into intimate contact at a bonding surface interface so as to form a microfluidic device; and,

causing said ~~the~~ polymerizable material to react and join across said ~~the~~ bonding surface interface, creating thereby a microfluidic device.

24. (Canceled)

25. (New): The method of claim 24 wherein the first and second thermoplastic workpieces are polyphenylenes and the first and second polymerizable materials are mixtures of styrene and divinylbenzene.

26. (New): The method of claim 25 wherein the mixtures have a ratio of approximately 9:1 by volume of styrene to divinylbenzene.

27. (New): The method of claim 23 wherein the first workpiece is a polyphenylene wherein the second workpiece is a polyetherimide and wherein the polymerizable material is styrene.